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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/123,430 07/28/98 YATES

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EXAMINER

MM22/0124

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ART UNIT

PAPER NUMBER

2823

DATE MAILED:

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/123,430

Applicant(s)

YATES, DONALD L.

Examiner

Brook Kebede

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-- The MAILING DATE of this communication appears on the cover sheet with the corresponding address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 1998.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 28-43 and 45-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 and 44 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
- a) ☐ All b) ☐ Some * c) ☐ None of the CERTIFIED copies of the priority documents have been:
1. ☐ received.
2. ☐ received in Application No. (Series Code / Serial Number) _____.
3. ☐ received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. & 119(e).

Attachment(s)

- 14) ☒ Notice of References Cited (PTO-892)
- 15) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 16) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2&5.
- 17) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 18) ☐ Notice of Informal Patent Application (PTO-152)
- 19) ☐ Other: _____.

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DETAILED ACTION***Election/Restrictions***

1. Applicant's election **with traverse** of Group II, claims 1-27 and 44 in Paper No. 4 is acknowledged. The traversal is on the ground(s) that " the claims of Group I are directed to an etching bath apparatus while the claims of Group II are drawn to methods of removing contaminants from a processing bath. Thus, contrary to the Examiner's assertion, the practice of the process of Group II would not result in the formation the etching bath apparatus of Group I. Therefore, it is respectfully submitted that the Examiner has not shown that the inventions of Group I and II are patentably distinct. " This is not found persuasive because method for removing contaminants from a processing bath and etching the semiconductor wafer are inherently interrelated. For example, claim 1 recites the limitation "a method for removing contaminants from a processing bath for processing the semiconductor wafers." The process takes place during the etching process of the semiconductor device. Although the Examiner's assertion of Group I "semiconductor device, classified in class 257, subclass 9 " and of Group II "a process of making a semiconductor device apparatus, classified in class 438, subclass 747" is incorrect, the restriction is still appropriate. Furthermore, method for removing contaminants from a processing bath for processing the semiconductor wafers of Group II can be performed by using physically or mechanically different type of apparatus of Group I. For instance, the etchant with contaminant can be removed from the top of the bath using an apparatus equipped with several devices, such as, various type of valves, vacuum pump, vacuum filters, control system,

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system, and etc.. Further, the removed liquid can also purified and recycled back to the bath.

Therefore, the inventions in Group I and Group II are distinct.

Should applicant traverse on the ground that the species are not patentably distinct, applicant should submit evidence or identify such evidence now of record showing the species to be obvious variants or clearly admit on the record that this is the case. In either instance, if the Examiner finds one of inventions unpatentable over the prior art, the evidence or admission may be used in a rejection under 35 U.S.C. 103(a) of the other invention.

The requirement is still deemed proper and is therefore **made FINAL**.

Oath/Declaration

2. A new oath or declaration is required because of the wording "I believe I am the original, first and joint inventor..." It is inappropriate for a single inventor. The declaration should included the wording, --I believe I am the original, first and sole inventor...--. The wording of an oath or declaration cannot be amended. If the wording is not correct or if all of the required affirmations have not been made or if it has not been properly subscribed to, a new oath or declaration is required. The new oath or declaration must properly identify the application of which it is to form a part, preferably by application number and filing date in the body of the oath or declaration. See MPEP §§ 602.01 and 602.02.

Drawings

3. The drawings are objected to because the lines of Figs. 16 and 17 are very blurry and difficult to see. Correction is required.

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Claim Objections

4. Claim 5 objected to because of the following informalities: Claim 5 recites the limitation "wherein said" twice in line 2. Appropriate correction is required.

Claim 6 objected to because of the following informalities: Claim 6 recites the limitation "wherein said" twice in line 2. Appropriate correction is required.

Claim 15 objected to because of the following informalities: Claim 15 recites the limitation "telescopically collapsing" in line 3. The term is unclear to the Examiner. Appropriate clarification is required.

Claim 25 objected to because of the following informalities: Claim 25 recites the limitation "telescopically collapsing" in line 2. The term is unclear to the Examiner. Appropriate clarification is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 2-5, 7-16, 20-26 and 44 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "...said semiconductor processing bath..." in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

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Claim 3 recites the limitation "...said semiconductor processing bath..." in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 4 recites the limitation "...the semiconductor processing bath" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 5 recites the limitation "...said semiconductor processing bath..." in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 7 recites the limitation "...the etching fluid" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim 8 recites the limitation "...said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 10 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 11 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 12 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 13 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 14 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

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Claim 15 recites the limitation "said etching fluid..." in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 9 and 16 rejected depending upon rejected claim.

Claim 20 recites the limitation "...said wet etching vessel" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 21 recites the limitation "...said upper portion..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 21 recites the limitation "...said wet etching vessel" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 22 recites the limitation "...said upper portion..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 22 recites the limitation "...said wet etching vessel" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim 23 recites the limitation "...said upper portion..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 23 recites the limitation "...said wet etching vessel" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

Claim 24 recites the limitation "...said upper portion..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 24 recites the limitation "...said wet etching vessel" in line 3. There is insufficient antecedent basis for this limitation in the claim.

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Claim 25 recites the limitation "...said upper portion..." in line 1. There is insufficient antecedent basis for this limitation in the claim.

Claim 25 recites the limitation "...said wet etching vessel" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 26 recites the limitation "...said wet etching vessel" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claims 18 and 19 rejected depending upon rejected claim.

Claim 44 recites the limitation "...said semiconductor boat..." in line 5. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-9, 14-15, 17-20, 24-26 and 44 rejected under 35 U.S.C. 102(b) as being anticipated by Nishizawa et al., USPAT/5,275,184.

Re claim 1, Nishizawa et al. disclose rapidly removing of process fluid with the contaminant from upper portion of the wafer bath while the wafer in the bath (see Fig. 2 and related text in Col. 2, lines 62-67 through Col. 5, lines 1-27).

Re claim 2, Nishizawa et al. disclose the semiconductor process bath as an etching bath (see Fig. 2 and abstract).

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Re claim 3, Nishizawa et al. disclose the semiconductor process bath as cleaning bath (see Fig. 1 and abstract).

Re claim 4, Nishizawa et al. disclose the removal of contaminants from the air/liquid interference (see Fig. 2)

Re claim 5, Nishizawa et al. disclose the semiconductor process bath as an etching bath (see Fig. 2 and abstract).

Re claim 6, Nishizawa et al. disclose the contaminants include silica (see Fig. 2)

Re claim 7, Nishizawa et al. disclose processing of semiconductor wafer in wet etching bath; rapidly removing an upper portion of the etching fluid while the wafer in the etching bath and removing of the wafer from the bath (see Fig. 2 and related text in Col. 2, lines 62-67 through Col. 5, lines 1-27; Col. 20, lines 7-14).

Re claim 8, Nishizawa et al. disclose substantial etching fluid can be removed from the etching bath (see Fig 2 and related text in Col. 3, lines 17-23).

Re claims 9 and 15, Nishizawa et al. disclose draining of the etching liquid (see Fig. 2 and related text in Col. 7, lines 2-14).

Re claim 14, Nishizawa et al. the etching fluid can be removed during removing of the wafer boat (see Fig. 2).

Re claim 17, Nishizawa et al. disclose processing of semiconductor wafer in wet etching bath; rapidly removing an upper portion of the etching fluid while the wafer in the etching bath and removing of the wafer from the bath (see Fig. 2, and related text in Col. 2, lines 62-67 through Col. 5, lines 1-27; Col. 20, lines 7-14).

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Re claim 18, Nishizawa et al. disclose the silicon wafer (see abstract)

Re claim 19, Nishizawa et al. disclose the use of HF (see related text in Col. 11, lines 18-20).

Re claim 20 and 25, Nishizawa et al. disclose draining of the etching liquid (see Fig. 2 and related text in Col. 7, lines 2-14).

Re claim 24, Nishizawa et al. disclose the etching fluid can be removed during removing of the wafer boat (see Fig. 2).

Re claim 26, Nishizawa et al. disclose removing of the liquid from the upper portion of the etching bath by physical means (see Fig. 2).

Re claim 44, Nishizawa et al. disclose processing of semiconductor wafer in wet etching bath; immersing of a wafer boat in etching bath for sufficient time; rapidly removing of the wafer from the bath (see Fig. 2 and related text in Col. 2, lines 62-67 through Col. 5, lines 1-27; Col. 20, lines 7-14).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 10, 16 and 27 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al., USPAT/5,275,184 in view of Itoh et al., USPAT/5,795,401.

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Re claim 10 and 16 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 7 except the use of paddle to remove the fluid from the top portion of the etching process bath. Itoh et al. disclose the use of back paddle to jet (remove) out the wash fluid during process of cleaning of semiconductor substrate (see related text in Col. 10, lines 18-48). Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with paddle as taught by Itoh et al. because the use of paddle would have provided another method of removing contaminants from the top of the wafer etching bath.

Re claim 27, Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 17 except the use of paddle to remove the fluid from the top portion of the etching process bath. Itoh et al. disclose the use of back paddle to jet (remove) out the wash fluid during process of cleaning of semiconductor substrate (see related text in Col. 10, lines 18-48). Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with paddle as taught by Itoh et al. because the use of paddle would have provided another method of removing contaminants from the top of the wafer etching bath.

11. Claims 11 and 21 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al., USPAT/5,275,184 in view of Mohindra et al., USPAT/5,958,146.

Re claim 11 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 7 except use of valve to remove the etching fluid. Mohindra et al. disclose the use of valve to remove during cleaning (etching) process of the semiconductor wafer (see related text in Col.

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3, lines 56-60). Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a valve as taught by Mohindra et al. because the use of valve would have provided another method of removing contaminants from the top of the wafer etching bath when the valve opens by mechanical means.

Re claim 21 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 17 except use of valve to remove the etching fluid. Mohindra et al. disclose the use of valve to remove during cleaning (etching) process of the semiconductor wafer (see related text in Col. 3, lines 56-60). Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a valve as taught by Mohindra et al. because the use of valve would have provided another method of removing contaminants from the top of the wafer etching bath when the valve opens by mechanical means.

12. Claims 12 and 22 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al., USPAT/5,275,184 in view of Woolderidge et al., USPAT/4,576,618.

Re claim 12 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 7 except use of door to remove the etching fluid. Woolderidge et al. disclose the use of door to provide access to the interior of the reservoir accommodating the periodic removal of sludge accumulating in the reservoir as a result of the particulates in the treating liquid settling to the bottom of the reservoir during operation to prevent the out ward flow of liquid during

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cleaning of the device (see related text in Col. 6, lines 28-33). Although the art is non-analogous to the claimed invention, it would have been obvious that the liquid would have flown rapidly when the door opens. Furthermore, it is common practice to attach a hinge to the door to provide easily opening and closing mechanism. Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a door as taught by Woolderidge et al. because the use of hingedly releasing door would have provided another method of removing contaminants from the top of the wafer etching bath when the door opens by mechanical means.

Re claim 22 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 17 except the use of hingedly open door to remove the etching fluid. Woolderidge et al. disclose the use of door to provide access to the interior of the reservoir accommodating the periodic removal of sludge accumulating in the reservoir as a result of the particulates in the treating liquid settling to the bottom of the reservoir during operation to prevent the outward flow of liquid during cleaning of the device (see related text in Col. 6, lines 28-33). Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a door as taught by Woolderidge et al. because the use of hingedly releasing door would have provided another method of removing contaminants from the top of the wafer etching bath when door opens by mechanical means.

13. Claims 13 and 23 rejected under 35 U.S.C. 103(a) as being unpatentable over Nishizawa et al., USPAT/5,275,184 in view of Krieger, USPAT/4,576,618.



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Re claim 13 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 7 except the use of sliding door to remove the etching fluid. Krieger discloses the use of sliding door to dump a fluid in the fluid treatment system (see related text in Col. 11, lines 14-36). In addition, it is well know practice in the art to provide a door with sliding mechanism in order to provide easily opening and closing mechanism. Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a sliding door as taught by Krieger because the using of a sliding door would have provided another method of removing contaminants from the top of the wafer etching bath when door opens by mechanical means.

Re claim 23 Nishizawa et al. teach all the limitation in the claimed invention as applied in claim 17 except the use of sliding door to remove the etching fluid. Krieger discloses the use of sliding door to dump a fluid in the fluid treatment system (see related text in Col. 11, lines 14-36). In addition, it is well know practice in the art to provide a door with sliding mechanism in order to provide easily opening and closing mechanism. Therefore, it would have been obvious to one ordinary skill in the art at the time of applicant's claimed invention was made to have provided Nishizawa et al. reference with a sliding door as taught by Krieger because the using of a sliding door would have provided another method of removing contaminants from the top of the wafer etching bath when door opens by mechanical means.

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Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. USPAT/5,996,595; 5,885,360; 5,839,456; 5,820,689; 5,579,792; 5,776,296; 5,000,207; 3,953,265; 3,869,313; 3,710,450; 3,630,804.

Search Area

438/745, 746, 747

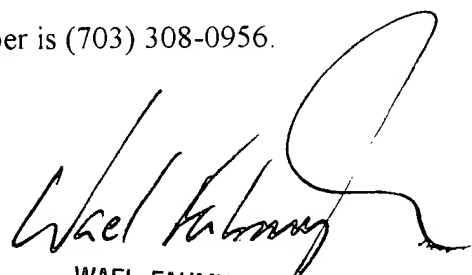
134/184, 345, 105, 102.1

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (703) 306-4511. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703) 308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Brook Kebede
BK
January 16, 2000


Wael Fahmy
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000